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EVALUATION OF  
Draft  
RCRA ADDITIONAL INVESTIGATIONS REPORT  
OPERABLE UNITS 1, 6, AND 7  
RCRA FACILITY INVESTIGATION  
NAVAL STATION ROOSEVELT ROADS  
CEIBA, PUERTO RICO

Submitted to:

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## 1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) has requested support for technical review of documents associated with the RCRA Facility Investigation (RFI) of the U.S. Naval Station Roosevelt Roads (NSRR) located in Ceiba, Puerto Rico. TechLaw has assigned this project to TRC, a TechLaw Team member under the REPA Contract under Work Assignment No. R02020.

The NSRR is located on the east coast of Puerto Rico in the municipality of Ceiba, approximately 33 miles southeast of San Juan. The primary mission of NSRR is to provide full support for the Atlantic Fleet weapons training and development activities. NSRR is currently operating under a Draft RCRA Corrective Action Permit that includes varying degrees of work at 28 Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs).

EPA requested the TechLaw Team to review the *Draft RCRA Additional Investigations Report for Operable Units 1, 6, and 7, Volumes 1 and 2*, dated May, 1998.

The TechLaw Team's report presents evaluations of the Draft RFI Report for Operable Units (OU) 1,6, and 7. The method and objective of this evaluation are presented in Section 2.0. General comments are presented in Section 3.0. Page-specific comments are detailed in Section 4.0. Editorial comments are present in Section 5.0 and recommendations are presented in Section 6.0.

## 2.0 METHODOLOGY

Pursuant to the EPA Work Assignment Manager's (WAM's) Technical Directive dated May 8, 1998, the TechLaw Team reviewed the Draft Additional Investigation for Operable Units 1, 6, and 7. In particular, The TechLaw Team focussed on Sections 2.0, 3.0, 4.0, and 5.0 with respect to the adequacy and acceptability of investigation activities, conclusions and analytical results. In addition, TRC compared the investigation methods and conclusions to three items 1) EPA guidance and standards, 2) the work plan for OU 1,6, and 7, and 3) previous EPA comments regarding the OU 1,6, and 7 Work Plan. Only outstanding issues are discussed within this evaluation.

The following documents were considered during this review:

- Final RCRA Facility Investigation, NSRR, P.R. prepared by Baker Environmental, Inc., dated September 1995;
- Interim Final RCRA Facility Investigation Guidance, OSWER Directive 9502.00-60, EPA 530/SW-89-031, May 1989;
- *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final*, OSWER Directive 9355-3-01, October 1988;

- *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites*, EPA/540/P-91/001, February 1991;
- *Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual; (Part A)* Interim Final, 540/1/-89, December 1989; and, *Development of risk-Based Preliminary Remediation Goals (Part B)* publication 9285.7-01B, December 1991, PB92-963333;
- *EPA Region III Risk-Based Concentration Table*, April 15, 1998;
- *Human Health Evaluation Manual, supplemental Guidance: "Standard Default Exposure Factors"* OSWER Directive 928.6-03 (EPA, March 25, 1991);
- *Supplemental Guidance to RAGS: Calculating the Concentration Term*, (publication 9285.7-08I, June 22, 1992);
- *Dermal Exposure Assessment: Principles and Applications* (EPA 600/8-91/001B, January 1992);
- *Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds*. Volumes I and III of III. Office of Research and Development, EPA, 1994.
- *Superfund Exposure Assessment Manual*. Office of Remedial Response. EPA, 1988. (EPA/540/1-88/001);
- *Exposure Factors Handbook*. Office of Health and Environmental Assessment. EPA, August 1997. (EPA/600/8-95/002Fa);
- *Final RCRA Facility Investigation*, P.R. prepared by Baker Environmental, Inc., Addendum 2, dated February 28, 1997; and
- Letter from USEPA addressing Addendums 1 & 2 to the Draft RCRA Facility Investigation Report - Operable Units 1, 6, and 7, U.S. NSRR, P.R., to U.S. Navy, April 25, 1998.

### 3.0 GENERAL COMMENTS

1. Site features illustrated in figures presented in Section 2.0 appear to have been significantly modified since the July 1996 Draft Phase I Report. The text should explain the modifications to the site features. Building 112 depicted in Figure 5-1 of the July 1996 report is not illustrated in Figure 2-2 of the May 1998 report. In addition, several

figures have dark dashed lines, which are not identified in the legends. The figures must be revised to clarify meaning of the dark dashed lines.

2. The human health risk assessment performed as part of the Draft Additional Investigations Report for OUs 1, 6, and 7 (SWMUs 6, 10, 13, 26, 31, and 46 and AOCs B, C, and D) complied with EPA guidance with several minor exceptions which are discussed below in page-specific comments. However, many of the Navy's conclusions and recommendations presented in Section 4.0 are not supported by the information provided in the risk assessment. The no further action recommendations for SWMUs 6, 26, and 31 and AOC D are not adequately justified. In addition, the Navy does not adequately respond to comments #1 and #2 in EPA's April 25, 1997 letter. The comments presented concerns regarding the derivation of background concentrations and additional exposure scenarios to be evaluated for SWMU 6, SWMU 26, SWMU 31, and AOC D. These issues are summarized below in items A through E and page-specific comments.

**A. Derivation of Background Constituent Concentrations**

The Navy's response to comment #1 in EPA's April 25, 1997 letter, does not address the concern regarding the derivation of site background constituent concentrations. As noted previously by EPA, the site background data and the SWMU 26 background data both include samples in which organics were detected. Xylene, PAHs, total HxCDD and 2,4,5-T were detected in the site background samples. Ten SVOCs were detected in the SWMU 26 background samples. The detection of organic constituents suggests that the background samples are impacted by human activity. Therefore, the inorganic constituents detected may not represent naturally occurring conditions. The Navy must evaluate the adequacy of the background data and present corrective actions to develop an adequate background data set.

**B. SWMU 6/AOC B**

The Navy must revise the risk assessment to address concerns identified in Comment #2, e and f of EPA's April 25, 1997 letter. Concerns were presented regarding the potential exposure of future residents and current workers to accumulated/standing water in Building 145 (where mercury was measured at a concentration of 22 ug/l). The Navy must quantitatively assess risks to on-site workers and future residents through accidental ingestion and dermal contact, to standing water in Building 145 and add the risks calculated for these exposures to the other exposure risks at AOC B. If unacceptable potential risk is indicated, a remedial work plan for cleanup operations must be submitted prior to initiating on-site work. This issue must be addressed before the recommendation of no further action at this site can be evaluated.

### **C. SWMU 26**

The Navy must clearly demonstrate that the beryllium is due to native sources or the Navy must revise the risk assumptions for beryllium and/or the basis of closure for SWMU 26. The Navy has asserted that the concentrations of beryllium (and other elements) are likely the result of background conditions. Beryllium is present in SWMU 26 surface soils at concentrations that would pose an unacceptable increased risk to future residents. This SWMU is located in an area which, according to text on page 2-14, may be used for base housing at some future point. If the Navy cannot demonstrate the beryllium is naturally occurring, then, assuming otherwise valid risk assumptions for beryllium and other identified contaminants, the no action alternative for SWMU 26 will be unacceptable.

The no action approach to SWMU 26 is based in part on the assumption of background conditions. This assumption appears to be inappropriate for two primary reasons. First, the background data set developed for arsenic and beryllium for SWMU 26 may not be valid. Ten different SVOCs were detected in both surface and subsurface background soil samples at SWMU 26, which suggests that soil in this area was impacted by anthropogenic activity and may not be representative of naturally occurring conditions for SVOCs. By extension, the concentrations of other constituents may have been impacted by anthropogenic activity. Second, the maximum detected concentration of beryllium detected in both surface and subsurface background soil samples for SWMU 26 is 1,200 ug/kg. This is over 3 times greater than the concentration of beryllium in the site-wide surface soil background database (360 ug/kg) and over 1.5 times greater than the site-wide subsurface soil background concentration (740 ug/kg). This data suggests that the SWMU 26 "background" levels are elevated and are not representative of native, mineralogically derived beryllium.

The second element of the Navy's no action approach is the assumption that the area will not be used for residential housing. However, text concerning SWMU 26 on page 2-14, paragraph 2 contradicts this assumption by indicating this area could be used for a base housing expansion in the future.

### **D. SWMU 31**

Dioxin was detected at concentrations in soil samples collected from SWMU 31 which exceeded EPA's risk-based acceptable concentration range for on-site workers. Although the Navy recommends an industrial land-use restriction on the SWMU to protect future residents from exposure, this land-use restriction does not protect current workers. According to the health and safety plan for this site, SWMU 31 is an area of "intense vehicular activity" and easily accessed by base personnel. Vehicular activity may disturb "hard packed" areas generating significant amounts of dust potentially containing elevated levels of dioxin. Therefore current workers may be exposed to unacceptable

levels of dioxin. The Navy must justify the no further action recommendation in the context of present use exposure scenarios. If the no action approach is not protective of current site workers, then 1) the no action assumptions must be revised, or 2) Health and Safety precautions including exposure monitoring, must be implemented to protect current site workers.

#### **E. AOC D**

The Navy's no further action recommendation for AOC D is not acceptable since Phase I sediment sampling results indicate that sediments present a potentially unacceptable risk to recreational users and future residents. The Navy must summarize these risks in Section 4.8 and indicate that conclusions regarding these risks are valid and are not modified by the Phase II sample results. The Navy must also provide recommendations for mitigating recreational user and future resident exposure to AOC D sediments.

3. Unacceptable risk based levels of dioxin compounds have been identified at various sites at NSRR during the RFI. The identification of dioxin compounds at certain sites (i.e. SWMU 1, 2, and 31, and AOC D) does not inherently correspond to the site specific uses. A separate source of dioxins appears to have entrained dioxin contaminants into the air pathway, depositing contaminants at various locations at the site. Two possibilities should be considered:
  - 1). Dioxin compounds may be present on-site at areas not yet discovered or sampled for dioxins (i.e. areas of air borne deposition or secondary deposition from runoff such as AOC D). This may have resulted in a more widespread and as of yet uncharacterized areas of dioxin contamination at NSRR.
  - 2). If a dioxin source is identified on-site as causing air borne contamination, the impact area could be addressed as a separate segregated site. Certain sites within the dioxin site could potentially be "closed", if a level of no significant risk was demonstrated for the remaining site specific contaminants of concern and the site use history did not support dioxin contamination.

The Navy must complete a study to investigate dioxin contamination detected across NSRR. All dioxin data for NSRR should be correlated to identify a potential source for dioxins and the potential migration pathways. A workplan should be prepared to address any data gaps identified by EPA prior to implementation.

#### **4.0 PAGE SPECIFIC COMMENTS**

##### **Page 2-2, Section 2.1.2.1 Paragraph 3 and 5 and Page 2-3, Section 2.1.2.3, Paragraph 3**

The Navy states that "... three semivolatile organic compounds ... were detected in [background surface soil] sample BGMW01-00" (see Table 2-3) and "Trace concentrations of organic compounds... were detected in the background subsurface soil sample set as shown in Table 2-4".

The presence of xylene, PAHs, total HxCDD and 2,4,5-T in the site-wide background data set is a strong indication that the results are not representative of natural conditions. All samples with detected organics must be eliminated from the organic compound background data set. This will result in an organic background data set of three surface soil samples and three subsurface soil samples. Average background levels must be recalculated and conclusions regarding risk must be revised.

##### **Page 2-14, Section 2.5.1, Paragraph 5**

The Navy has not demonstrated that "...the concentrations (of arsenic and beryllium) are likely the result of background conditions..." at SWMU 26. First, the background data set developed for arsenic and beryllium for SWMU 26 may not be valid. Ten different SVOCs were detected in both surface and subsurface background soil samples at SWMU 26, which suggests that soil in this area was impacted by anthropogenic activity and may not be representative of naturally occurring conditions for SVOCs. By extension, the concentrations of other constituents may have been impacted by anthropogenic activity. Second, the maximum detected concentration of beryllium detected in both surface and subsurface background soil samples for SWMU 26 is 1,200 ug/kg. This is over 3 times greater than the concentration of beryllium in the site-wide surface soil background database (360 ug/kg) and over 1.5 times greater than the site-wide subsurface soil background concentration (740 ug/kg). This data suggests that the SWMU 26 "background" levels are elevated and are not representative of native, mineralogically derived beryllium. If the Navy cannot demonstrate that the beryllium is naturally occurring, then, assuming otherwise valid risk assumptions for beryllium and other identified contaminants, the no action alternative for SWMU 26 will be unacceptable.

In addition, with regard to the no further action approach advanced by the Navy for SWMU 26, beryllium is present in surface soils at concentrations posing potentially unacceptable increased risk to future residents. The no action approach relied on the assumption that no residents would be present in the future. However, this SWMU is located at an area which, according to text on page 2-14, may be used for base housing at some future point.

The Navy must clearly demonstrate that the beryllium is due to native sources and must revise the risk assumptions for beryllium and/or the basis of closure for SWMU 26.



**Page 2-20, Section 2.7.2, Paragraph 1**

The text states that samples ACSS39 through ACSS41 were inadvertently labeled SWMU AOC C instead of SWMU 46. No analytical data for these samples are presented in Table 2-31, Table 2-36, or Appendix D. The analytical data from these samples should be included.

**Page 2-21, Section 2.7.3.1 and Figure 2-13**

The extent of PCB contamination at SWMU 46 and AOC C has not been adequately delineated and must be delineated via further surface and subsurface soil sampling. Figure 2-13 illustrates an increase in PCB levels in soil at the location of soil sample AC-SS27. This increase in PCB levels reflects an increase in contaminant levels at the perimeter of the site. Additional samples should be collected to delineate the extent of PCB contamination.

**Page 2-23, Section 2.8.2, paragraph 1 & 2**

The text should report on the wipe sampling conducted at SWMU AOC C. Analytical results presented in Appendix D indicate that Aroclor 1260 was detected in several samples at a maximum concentration of 130,000,000 mg/wipe. The significance of the results must be discussed.

**Page 3-2, Section 3.1.1, Paragraph 2**

The identification and selection of chemicals of potential concern (COPCs) must consider chemicals for which there are no toxicity criteria or EPA Region III screening values. The detected concentrations of such chemicals must be carried through the risk assessment and addressed qualitatively in the risk characterization and uncertainty sections of the risk assessment text. For example, methapyrilene was detected in a SWMU 6 subsurface soil sample at a concentration of 930 ug/kg. Although no Risk Based Concentrations (RBCs) are established for this constituent, the chemical must be carried through the risk assessment.

**Page 3-6, Paragraph 3 & 4**

Total, rather than dissolved, inorganic results must be quantitatively evaluated in the human risk assessment. It is not appropriate to assume concentrations from dissolved samples more closely approximate exposure conditions at the tap, when the actual characteristics of a possible future water supply are unknown. The Navy must revise the quantitative risk assessment to include total inorganic results.

**Page 3-6, SWMU 06/AOC B**

For clarity, the text should summarize subsurface soil analysis results and indicate that all detections were below applicable residential RBC's. The detection of methapyrilene should be

presented and the potential increased risk, if any, posed by this chemical should be qualitatively addressed in the uncertainty and risk characterizations sections. Methapyrilene should not be eliminated from consideration simply because a toxicity value does not exist.

**Page 3-13, Paragraphs 3 and 4**

In Phase II, additional sediment samples were collected from two locations at AOC D that were not sampled during Phase I. The results of these two new samples indicate the presence of chemicals at concentrations less than or equal to that detected in Phase I samples. The text should clarify that Phase II results were collected at new locations and should not be considered duplicate results of samples collected during Phase I. The comparison of the Phase I data to the Phase II data "in lieu of a risk assessment" is potentially misleading and may cause the reader to infer that the Phase II data supersedes the Phase I data. The text must clearly indicate that the risks estimated during the Phase I HEA are still valid.

**Page 3-23, Paragraph 3 and Page 3-53, Paragraph 2**

The statement "The area will not be developed for personnel housing in the future.." is inconsistent with page 2-14, paragraph 2, the text of which states, "The Building 544 Area is located within the "Bundy" portion of the station. Bundy is a primary location for bachelor's quarters and, therefore, it is possible that the Building 544 Area could be used for base housing expansion at some point in the future." The text must be revised since residential development is possible.

**Page 3-31, Paragraph 2**

The Navy's derivation of the particulate emission factor (PEF) should be provided since it differs from EPA's Human Health Evaluation Manual, Development of Risk-Based Preliminary Remediation Goals (Part B), dated December 1991 ( $6.79 \times 10^9 \text{ m}^3/\text{kg}$  vs.  $4.63 \times 10^9 \text{ m}^3/\text{kg}$ ).

**Page 3-48, Section 3.6.3, Paragraph 3**

The reference to the 1989 Exposure Factors Handbook should be updated to EPA's Exposure Factors Handbook (EPA/600/P-95/002Fa), dated August 1997.

**Tables 3-16, 3-17 and Appendix G**

The guidance referenced by the Navy for the exposure input parameters for inhalation of contaminated air states that "...  $20 \text{ m}^3$  per 8-hour workday represents a reasonable upper-bound inhalation rate for the occupational setting". The Navy, however, is using input parameters for respiration rate and exposure time which result in an inhalation rate of  $10 \text{ m}^3$  per 8-hour workday. The input parameters for respiration rate and exposure time must be changed to reflect an

inhalation rate of 20 m<sup>3</sup> per 8-hour workday for current on-site workers and future construction workers.

**Page 4-3, Section 4.3, Paragraph 1**

The streamlined CMS proposed for SWMU 13 will be considered incomplete until an ecological assessment demonstrates that a condition of no unacceptable risk to the environment has been achieved.

**Page 4-4, Paragraph 6 and Page 4-5, Paragraph 4**

In order to support a no further action at SWMU 46 and AOC C a reliable background data set must be used. Based on the detection of organics, the CMS for SWMU 46 and AOC C must address elevated levels of arsenic and beryllium. The current background data set does not appear to adequately represent natural soil conditions.

**Page 4-5, Section 4.6 and 4.7**

The additional proposed investigation activities must be documented in a work plan addendum and submitted for review.

**Page 4-6, Section 4.8**

The no further action recommendation for AOC D sediments is not consistent with the Phase I HEA which stated that AOC D sediments pose potentially unacceptable risks to recreational users and future residents. The Navy must summarize these risks in Section 4.8 and state that conclusions regarding these risks are still valid and must re-evaluate the no further action recommendation. Recommendations for mitigating recreational user and future resident exposure to AOC D sediments must be provided.

**5.0 EDITORIAL COMMENTS**

**Table 2-43**

Results presented in Table 2-43 need to be cross-checked with analytical results in Appendix D and revised as appropriate. The data presented in Table 2-43 are not consistent with corresponding data contained in Appendix D.

**Figure 2-3**

Sample identifiers BGW02-03 and BGW02-04 should be labeled BMW-02-03 and BMW-02-04 for consistency with sample identifiers in Table 2-10 and Section 2.

### **Page 3-5, Paragraph 3**

Although TPH concentrations do not exceed Puerto Rico Environmental Quality Board (PREQB) criteria, the Navy's statement "... due to a lack of toxicity criteria, TPH was not evaluated in the selection of COPCs, nor was it evaluated in the risk assessment" must be revised to avoid future misunderstanding. Any detected levels of TPH must be evaluated and concentrations which exceed PREQB criteria must be addressed in the risk characterization section.

### **Table 2-43**

The summary columns on page 4 of 4 must be revised. The summary columns indicate that 33 sample results were included in the data evaluation; however, results from only 27 samples are presented on pages 1 through 3 of Table 2-43.

### **Page 3-9, Paragraph 1 (SWMU 46) and Table 3-5**

The number of soil samples presented in the text and Table 3-5 is inconsistent with the number of soil samples presented in Section 2.0 and Table 2-35 and must be revised as appropriate.

### **Page 3-10, Paragraph 5**

The number of soil samples presented in the text and Table 3-27 is inconsistent with the number of samples presented in Section 2.0 and Tables 2-36 and 2-37 and should be revised as appropriate. The text and Table 3-7 indicate that 29 surface soil samples were collected; however, Section 2.0 text and corresponding Tables 2-36 and 2-37 list 26 soil samples.

### **Table 3-4**

The RBC's listed for total TCDF on this table are incorrect and must be revised.

### **Table 3-11**

Table 3-11 indicates that no dioxin data was generated in Phase II. Since this is incorrect, the table must be revised.

### **Page 4-1, Section 4.0, Paragraph 1**

The text should summarize estimated risks and subsequent conclusions and recommendations generated during the Phase I HEA.